

Device for the extraction of a substance having a moveable component

The present invention relates to a device for the  
5 extraction of a substance for the preparation of a  
beverage, comprising

- a fixed first component,
- a second component moveable relative to the first  
10 along an axis of rotation arranged at the rear of  
said two components, the front of each component  
forming a housing for the substance to be extracted,  
and
- means for closing and opening the two components,  
said means being integral with the fixed part and  
15 with the moveable part.

In known coffee machines for the extraction of closed  
cartridges, for example the device which is the subject  
of the patent EP 412,570, there is no moveable part, so  
20 that the machine is in one piece and the water which  
stands in order to arrive at the housing of the  
substance to be extracted is in a hot environment, to  
be precise at a temperature of the order of 90°C. There  
is therefore no risk that the temperature of the water  
25 will fall. By contrast, in a machine with a moveable  
component, such as, for example, Patent Application  
WO 94/02059 and Patent Application EP 99117107.5 of 31  
August 1999, the heating body of the machine is not in  
proximity to the housing for the substance to be  
30 extracted. The result of this is that, if the control  
for starting the machine and the valve integrated in  
the machine are placed at some distance from the  
housing for the substance to be extracted, there is a  
certain amount of standing water. In fact, the valve  
35 makes it possible for the heating body to empty as far  
as the valve, but not beyond it. The connecting pipe  
between the housing for the substance to be extracted  
and the valve remains full of water, said water in time

becoming cold. The more time elapses between two successive coffee preparations, the more the temperature of the water will fall and the greater will be the effect on the temperature of the coffee prepared afterwards.

The object of the present invention is, therefore, to reduce the amount of standing water, so that, from the moment when the machine is put into operation, there is only a slight effect on the temperature of the prepared coffee.

The present invention relates to a device for the extraction of a substance for the preparation of a beverage according to the preamble of Claim 1, in which said device comprises a control and a valve associated with said control, which are placed on the upper part of the moveable second component, in such a way that said control and said valve are near to the housing for the substance to be extracted.

The amount of standing water is thereby reduced significantly. For example, without the arrangement according to the invention, a volume of standing water of the order of 10-15 ml occurs, whereas, according to the invention, the volume of standing water is reduced to 1-3 ml. This means that, for a coffee volume of the order of 40-100 ml, even after relatively long intermission, the first coffee after said intermission has the same temperature as the others made by means of the device according to the invention. This is certainly not the case in the conventional system which may provide a coffee having a temperature 5°C lower because of the high volume of standing water.

The means used for closing and opening the two components may be of any type, in particular those

described in the abovementioned European Patent Application number 99117107.5.

The control of the system acts directly on the  
5 direction assumed by the water, that is to say on the  
valve for distributing the water. In the device  
according to the invention, the control and the  
associated valve have a position of rest, a beverage  
preparation position and a steam formation position. In  
10 the position of rest, the residual water is rejected:  
it goes without saying that this rejection takes place  
only at the moment when the control is switched into  
the position of rest, that is to say at the end of  
extraction, for example of a coffee cartridge. In the  
15 beverage preparation position, the water coming from  
the heating body passes directly into the housing for  
the substance to be extracted, for a duration necessary  
for extracting the cartridge. As mentioned above, at  
the end of extraction, there is a return to the  
20 position of rest. The last position is the steam  
generation position, for example in order to heat the  
milk during the preparation of a cappuccino coffee.

The type of valve which can be used according to the  
25 invention is not critical. A ceramic valve is  
preferably used.

The device according to the invention is normally  
actuated manually. It is also possible for the valve  
30 provided to be a solenoid valve controlled by  
electronics making it possible to stop the coffee at a  
preprogrammed volume.

The rest of the description is made with reference to  
35 the drawings in which:

Figure 1 shows in perspective a device for the  
preparation of a beverage having a moveable component,

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Figure 2 is a diagrammatic illustration of the device according to the invention at rest, and

5 Figure 3 is a diagrammatic illustration of the device according to the invention in the coffee preparation position.

The device for beverage preparation comprises:

- 10 - a fixed first component (1),
- a second component (2) moveable relative to the first along an axis of rotation (3) arranged at the rear of said two components, the front of each component (1, 2) forming a housing (4) and (5), respectively,
- 15 for the substance to be extracted,
- said device comprising furthermore, means for closing and opening the two components, said means comprising a two-armed closing lever (6) and two pull rods (7).

20 This device and also its functioning are already described in the abovementioned European patent application.

A closing lever (6) comprises the gripping part (8) and  
25 the actual lever part which has a virtually 90° bend. The pull rod may be straight or, as in the figure, have curved ends. The housing (4) comprises a peripheral rim (9) and the housing (5) a peripheral rim (10).

30 The two arms of the closing lever (6) are fastened rotatably along a first axis (11) on either side of the second component (2) and the pull rods (7) are fastened rotatably along a second axis (12) on either side of the first component (1). Those two ends of the two arms  
35 of the closing lever which are opposite the gripping part (8) and the two ends of the pull rods (7) are integral with one another along a third moveable axis (13), in such a way that the closing lever cooperates

with the rods in order to ensure the closing and opening of the device according to the invention.

The consumer arranges in the housing (4) a capsule or  
5 cartridge to be extracted (not illustrated). He then pulls the gripping part (8) of the closing lever (6) forwards in the direction of the arrow A, so as to cause said lever to rotate about its axis (11), this then driving the pull rod (7) upwards along the axis  
10 (13) and causing the moveable part (2) to descend (arrow B) towards the fixed part (1). The closing position is assumed when the closing lever is substantially in a horizontal position and the pull rods are in a vertical position. At this moment, the  
15 peripheral rims (9, 10) of the housings (4, 5) face one another and must ensure that the device has a high degree of leak-tightness.

Figures 2 and 3 show the control device which is not  
20 illustrated in Figure 1: this device is placed in the zone C of Figure 1 on the moveable part (2). The identical elements have been given the same reference numerals. The moveable part (2) comprises a housing (5) for the cartridge to be extracted and a peripheral rim  
25 (10). The valve (14) makes it possible to direct the hot water arriving via the conduit (16) either for rejection via the conduit (17) or towards the cartridge via the conduit (21) or for steam generation. This operation is made possible by the control (15): for  
30 this purpose, the control (15) is integral with a disc comprising a switching slot, and this disc, depending on its position, puts the main hot-water intake (23) in communication either with the outlet (19) for rejection or with the outlet (18) towards the cartridge to be  
35 extracted or with the outlet (20) for the generation of steam.

The device functions as follows: a cartridge is placed in the housing (4) and the user closes the moveable part (2) by lowering it by means of the gripping part (8). At rest, the device is in the position shown in Figure 2: the cartridge is in the housing (5) and the needle (22) pierces the top of said cartridge. The user then pulls the control (15) towards him, thereby putting the device into the position shown in Figure 3: the hot water passes via the conduits (16) and (21) and arrives at the needle (22) for extracting the cartridge. This extraction is known and described in Patent Application WO 94/02059: there is therefore no need to describe it again, since this extraction is not the subject of the present invention. The coffee flows into a cup arranged underneath the housing (4). When the amount of coffee in the cup is considered sufficient, the user pushes back the control (15) in order to return to the position shown in Figure 2: the residual water is then rejected via the conduit (17).

As mentioned above, the water which stands at the moment when the machine is not in use is only that which is in the conduit (21), thus corresponding to a volume of the order of 1-3 ml. This small amount does not have a great influence on the final temperature of the coffee obtained, that is to say it does not appreciably lower the temperature of the complete cup.

What is claimed is:

1. A flowable-food preparation device, comprising:
  - first and second components;
  - an extraction housing associated with the first and second components for receiving a substance and a fluid therein and for extracting the substance with the fluid to provide the flowable food, wherein the first component is movable for opening the housing for receiving the substance and closing the housing for extracting the substance and fluid;
  - a valve mounted on the first component; and
  - a fluid intake associated with the valve for feeding the fluid thereto, wherein the valve is configured for selectively directing the fluid to or away from the housing, the valve having:
    - a first position for directing the fluid to the housing,
    - a second position for directing the fluid to an outlet, and
    - a third position for directing the fluid to a third conduit.
2. The device of claim 1, wherein the second component is substantially fixed against rotation.
3. The device of claim 1, wherein the first component is rotatable for opening and closing the housing.
4. The device of claim 3, wherein the first and second components are rotatably connected at an axis of rotation.
5. The device of claim 1, wherein the housing is configured for receiving a substance container that contains the substance.
6. The device of claim 5, further comprising a feeding member associated with the housing and configured for feeding the fluid into the container.

7. The device of claim 6, wherein the feeding member comprises a piercing member configured for piercing the container to feed the fluid into the container.
8. The device of claim 1, further comprising a valve control that is manipulable by a user and operably associated with the valve for controlling the valve.
9. The device of claim 8, wherein the valve control comprises a lever that is pivotable for operating the valve.
10. The device of claim 1, wherein the valve comprises a disk with a switching slot for selectively directing the fluid to or away from the housing.
11. The device of claim 10, wherein the valve comprises a ceramic.
12. The device of claim 1, further comprising electronics associated with the valve for operating the valve to stop further fluid from reaching the housing once a predetermined volume of fluid has been directed to the housing.
13. The device of claim 12, wherein the predetermined volume is selected for filling a cup.
14. The device of claim 1, wherein the valve is disposed sufficiently near the housing such that a volume of standing fluid of less than about 3 ml remains therebetween when the valve stops the fluid from flowing to the housing.
15. The device of claim 1, wherein the valve is operable to direct the fluid away from the housing, the liquid intake being connected for delivering the fluid such that the fluid is aqueous, and the outlet conduit is configured for delivering the fluid as steam.
16. The device of claim 1, wherein the third conduit is a rejection conduit for rejecting

the fluid.

17. A beverage machine for preparation of a beverage, comprising:
  - first and second components;
  - an extraction housing associated with the first and second components for receiving a substance and a fluid therein and for extracting the substance with the fluid to provide the beverage, wherein the first component is movable for opening the housing for receiving the substance and closing the housing for extracting the substance and fluid;
  - a valve mounted on the first component; and
  - a fluid intake associated with the valve for feeding the fluid thereto, wherein the valve is configured for selectively directing the fluid to or away from the housing to a rejection conduit for rejecting the fluid.
18. The beverage machine of claim 17 wherein the valve has:
  - a first position for directing the fluid to the housing;
  - a second position for directing the fluid to an outlet; and
  - a third position for directing the fluid to the rejection conduit.
19. The beverage machine of claim 17, wherein the liquid intake is connected for delivering the fluid such that the fluid is aqueous, and the outlet conduit is configured for delivering the fluid as steam.
20. The beverage machine of claim 19, wherein the beverage machine is a coffee machine, and the beverage is coffee.
21. The beverage machine of claim 17, wherein the beverage machine is configured for placement and filling of a cup under the extraction housing.